

CLAIMS

What is claimed is:

1. A refrigerant cycle comprising:

a compressor;

an outdoor heat exchanger;

an indoor heat exchanger;

a valve assembly for selectively communicating a flow of refrigerant from said outdoor heat exchanger to an economizer heat exchanger in cooling mode, and said valve assembly communicating a flow of refrigerant from said indoor heat exchanger to said economizer heat exchanger in heating mode, said valve assembly presenting a restriction to refrigerant flow downstream of said economizer heat exchanger in both said cooling and heating modes.

2. A refrigerant cycle as set forth in claim 1, wherein said valve assembly includes a sliding spool piston, with end faces of said sliding spool piston providing said restriction to flow with at least one port in a valve body for receiving said spool piston.

3. A refrigerant cycle as set forth in Claim 2, wherein two distinct restrictions are formed by said ports and said sliding spool piston in said cooling mode, and said heating mode.

4. A refrigerant cycle as set forth in claim 1, wherein an economizer expansion valve and shut-off valve are placed on a tap line upstream of said economizer heat exchanger.
5. A refrigerant cycle as set forth in claim 1, wherein distinct size restrictions are presented to said refrigerant flow in said cooling mode and said heating mode.
6. A refrigerant cycle as set forth in claim 1, wherein said valve assembly is a four-way valve.

7. A refrigerant cycle comprising:

a compressor;

an outdoor heat exchanger;

an indoor heat exchanger;

a first valve for selectively providing a flow of refrigerant from said compressor to said outdoor heat exchanger in cooling mode, or to said indoor heat exchanger in heating mode; and

a second valve assembly for providing an expansion device to a flow of refrigerant from said outdoor heat exchanger in cooling mode, providing an expansion device to said flow of refrigerant, from said indoor heat exchanger in heating mode, said second valve assembly including a sliding spool piston sliding in a valve body, said valve body having at least two ports, and end faces of said sliding spool piston providing a restriction to flow with each of said two ports provide distinct restrictions to flow in said cooling and heating modes.

8. A method of operating a refrigerant cycle comprising the steps of:

(1) providing a first valve for selectively communicating a refrigerant from a compressor to an outdoor heat exchanger, or to an indoor heat exchanger, dependent on whether the refrigerant system is in a cooling or heating mode, providing a tap line for tapping refrigerant to provide an economizer function from either downstream of said outdoor heat exchanger in a cooling mode, or downstream from said indoor heat exchanger in a heating mode, and providing an economizer heat exchanger downstream of said tap line; and

(2) moving a second valve to selectively communicate said tap line to a location either downstream of said outdoor heat exchanger or said indoor heat exchanger, in combination with movement of said first valve, and providing a restriction to flow downstream of said economizer heat exchanger for a main refrigerant flow path and in said second valve, said restriction being provided to be of different orifice size when said refrigerant cycle is in a cooling mode or a heating mode.